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ABSTRACT

This unit, an interdisciplinary ecological approach to study communities in nature, considers various types of relationships such as mutualism, commensalism and succession to determine general characteristics of a community and interrelationships between communities. Designed for primary school children, food chains, food webs, reproduction, competition and job opportunities related to communities in nature are presented. The unit includes cognitive, psycho-motor and affective behavioral objectives, expected student criteria for evaluation, pretests and posttests, suggested methodologies for teaching each concept, relevant background information, a vocabulary list, student data sheets and a bibliography of both student and teacher resources. (MLB)

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ENVIRONMENTAL ECOLOGICAL EDUCATION PROJECT

Parkway School District
Chesterfield, Missouri

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Unit: Communities in Nature
Revised, June, 1972.

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COMMUNITIES IN NATURE

"There is no other door to knowledge than the door nature opens; there is no truth except the truth we discover in nature."

Luther Burbank

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SETTING

The setting for studying communities can be found everywhere in the environment. For example, a pond, a rotting log, a milkweed pod, an anthill, a bee hive, a creek, a school, and man's community, all provide the needed learning opportunities.

Included in this unit you will find specific information about a tree community; a vocabulary list of new words helpful in understanding the concepts and objectives; five environmental community factors; and worksheets for the students.

You will find examples of various types of relationships including mutualixm, commensalism and succession. The importance of reproduction, and competition and the interrelationships between communities will also be explained.

Included in the unit you will find a section on how the general characteristics of a community are applied to a tree community. Use this as a model for your teaching.

We have attempted to write this unit using three types of behavioral objectives. They include: 1) cognitive objectives which test the child's storage of knowledge; 2) psychomotor objectives which let the child actually perform activities; and 3) affective objectives which allow the child to express his own feelings and emotions (his personal evaluation).

We have written this unit using an interdisciplinary approach to learning. It is designed for the primary level but could be easily be adapted to the upper grades.

Do not feel you must use all the behavioral objectives that we have listed. Feel free to choose those that are appropriate to your particular grade level and interests. Also feel free to modify the stated objectives for your own use or write additional objectives. If you change the objectives, be sure to alter the pre-post test and evaluation of the unit to fit the new behavioral objectives.

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CONCEPTS

I. A community is a group of living organisms consisting of plants and animals interacting with each other in a particular place.

II. There are non-living environmental factors which are important to all communities.

- A. Light
- B. Temperature
- C. Air
- D. Water
- E. Soil type and bedroc

III. Seasons will affect the life cycle of communities.

IV. Plants are the basis of almost all communities.

V. Man's community is man controlled and thus artifical.

VI. Plants and animals in a community affect each other.

VII. Many types of relationships that deal with the food chain or food gathering go on in communities.

- A. Producers
- B. Plant-eating organisms
- C. Animal-eating organisms
- D. Parasites
- E. Scavengers
- F. Decomposers

VIII. A community provides an environment for reproduction to take place in order to continue the species.

IX. There is competition between animals of different kinds and between those of the same kind. This is also true of plants.

X. A type of relationship which may exist in a community is mutualism.

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XI. A type of relationship which may exist in a community is commensalism.

XII. Many communities change through time. One kind of commuity can replace another in a given location. This series of events is called succession.

XIII. The last community to develop in a given location is called a climax community. A climax community is able to reproduce itself for hundreds of years.

XIV. There are many careers which a person can pursue that are related to communities in nature.

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BEHAVIORAL OBJECTIVES

Upon completion of the unit or at the time when the teacher feels the concept has been covered. . .

Concept Number		
I.	1.	All the children will be able to recognize that a community is a group of animals and plants living together.
I.	2.	Individually or in small groups, all the children will be able to draw an example of a community.
II.	3.	All the students will be able to list (in writing) or describe orally five non-living environmental factors in almost all communities.
III.	4.	Ninety percent of the class will realize that changing seasons affect life in communities.
IV.	5.	Ninety percent of the children will know that plant life is the basis of all communities.
V.	6.	Eighty percent of the class will recognize that a man-made community is an artificial community.
VI.	7.	Ninety percent of the class will be able to recognize that plant and animal communities affect each other.
VII.	8.	Eighty percent of the children will be able to draw or write about a given example of a food chain and identify the producer and two consumers.
VIII.	9.	Ninety percent of the children will be able to recognize that plants and animals must reproduce so that the species can go on.
IX.	10.	All the children will be able to identify competition as the struggle between organisms for food and life.
X.	11.	The children will be able to recognize a definition of mutualism as two organisms living together and both benefiting.

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XI. 12. Ninety percent of the class will be able to identify a given definition of commensalism as the interaction of two organisms where one derives benefits and the other is not hurt.

XII. 13. Eighty percent of the children will recognize what is meant by the word "succession."

XIII. 14. Ninety percent of the children will be able to identify a given definition of a climax community.

XIV. 15. Seventy percent of the students will be able to list at least three possible careers related to communities in nature and activities involved in each career.

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PRE-POST TEST

I. Write T if the answer is true and F if the answer is false.

Behavioral objective and test question number--

1. 1. A community is a group of plants and animals living together.

4. 2. Life in communities does not change with the seasons.

5. 3. All communities must contain plant life.

6. 4. An artificial community is one which must be controlled by man.

9. 5. Plants and animals must reproduce in order for the species to go on.

7. 6. Plant and animal communities do not affect each other.

II. Fill in the blanks with correct answer

3. 7. List the five non-living things that are found in all communities.

a. _____
b. _____
c. _____
d. _____
e. _____

8. 8. One example of a food chain is a cow, grass and man. Put them in the correct order as they would appear in the food chain, and label them producer and consumer.

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15. 9. List three possible careers related to communities in nature, and three activities a person who held each job would perform.

A. _____
1. _____
2. _____
3. _____

B. _____
1. _____
2. _____
3. _____

C. _____
1. _____
2. _____
3. _____

III. Complete these sentences by putting the correct letter from the second column on the blank line.

13. 10. Succession is _____

14. 11. A climax community is _____

10. 12. Competition is _____

11. 13. Mutualism is _____

12. 14. Commensalism is _____

a. The last community to develop in a given area.
b. when one community replaces another community.
c. when two organisms interact with one benefiting and the other not hurt, such as the bludbird living in a woodpecker hole.
d. when organisms struggle with each other for food or for life.
e. when two organisms live together and both benefit.

IV. On the back of this paper, draw an example of a community.

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PRE-POST TEST
ANSWER SHEET

There are 15 points possible. Each question is worth 1 point.

I. True and False

1. T
2. F
3. T
4. T
5. T
6. F

II. Fill in the blanks

7. air, water, temperature — light, soil

(3 out of 5 must be correct to score one point)

8. grass — producer; cow — consumer; man — consumer

(All answers must be correct and in proper order to score one point.

9. forest ranger, conservationist, urban planner — state agricultural agent, science teacher

Any of the above are acceptable. All 3 answers must be correct to score one point.

III. Completion

10. b
11. a
12. d
13. e
14. c

IV. Drawings will vary and must be individually evaluated.

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BACKGROUND INFORMATION

In our world we find forests-roads-meadows-hedgerows-and open fields, swamps, rivers, small streams, lakes, ponds, flower beds, gardens, rotting logs, ant hills, bee hives, towns, cities, and countless other areas. These may be considered as communities.

Ecologists consider a biotic community to be any collection of plants and animals living in a given area which are held together by their relationships with and dependence upon each other.

On your school site you will find plants, birds, insects, worms, and other small animals making homes that make up a community. Around your school you might find a pond community creek life, forest life, an anthill, or even a community as simple as a milkweed plant.

When two different communities meet and blend, this forms an ecotone. An example would be where the forest meets the low-growing plants.

Five basic factors are needed for a community to function. The first is light, which is the source of energy necessary for green plants to carry on photosynthesis. All animals are directly or indirectly dependent upon the food substances produced by green plants.

The second essential factor is temperature. Temperature is a limiting factor in regard to plant and animal adaptation.

Atmospheric gases are still another factor.

Humidity and water are very necessary for plants and animals to function and survive.

Finally, the substratum is the material on which the organism lives. This may also be a limiting factor.

Every living thing has a will for life to go on. Consequently, in order to survive, all species must reproduce. Because of this "great will to live", all living things seem to cooperate as well as to compete with one another.

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Competition is a living factor that may limit population growth. One definition of competition is rivlary resulting from wanting or needing the same thing. Two organisms may both need something that is in short supply. Animals compete for food and shelter; plants may interfere with each other for sun and water. If the competiton is severe one of the species may be eliminated completely, forced into another way of living, or compelled to move to another geographical location.

There are many examples of competition to be found in nature. You can observe competiton for sunlight by looking at the comparative sizes of the leaves on trees. Trees under the canopies of larger trees will probably have large leaves which enable them to absorb as much sunlight as possible. Grasses and weeds compete for space in meadows. In ponds you can find evidence of animals and smaller organisms competing for food. Birds compete for space when building their nests. One example is the wren, which sections off territory around its nest which no other bird is allowed to enter. You can find competition when children play games, line up, etc. You can observe competition in a city park or street, or in a suburban garden where pigeons, sparrows, starlings, and other birds live together. Or watch the squirrels feeding and chasing and you will soon realize that much of the chasing that appears to be in fun is in reality a form of competition.

The predator-prey relationship is an important and necessary part of any community, for the predator helps to keep the population in balance. Predators kill for food and not out of hate for their prey. Examples of predator-prey can be found in watching birds eating worms, fish eating other fish, and even in man himself as a hunter. These are easily accessible examples to demonstrate this concept to children.

All living things are engaged in a constant search for nourishment. Thus the food chain begins. The sun is the source of energy for life. But only green plants have the ability to use the energy of sunlight to manufacture energy-filled foods from inorganic matter. The animal kingdom must live on other living things with both plants and animals serving as food.

The food chain begins with a green plant, which is the producer. Next in line is the first-order consumer, the plant

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eater. One, two or three meat eaters may follow in the chain of nourishment that ties the natural communities together. Next in line in the food chain are the decomposers, bacteria and mold, which reduce consumers into organic and inorganic matter which returns to the soil. An example of a simple food chain might be grass, cow, man, decay and grass. The cow eats the grass, man kills the cow for food, man's waste products go back into the soil, which in turn, again produces grass. Another simple example might be a mouse eating a green plant, and then a mountain lion eating the mouse.

A food web differs from a food chain when, at any point along a food chain line, several consumers are competing for a producer. (See diagram on Data Sheet #1)

There are other ways in which plants and animals live together. They are called commensalism and mutualism. Commensalism is a common relationship in which one partner benefits and the other is unaffected. One partner may derive food, transportation, or protection. An example is a vine growing on a tree. The vine benefits from the support of the tree and the tree remains unaffected. Other examples include bluebirds living in a woodpecker's abandoned home in a tree; cockroaches living in houses scavenging scraps of food; algae living on shells of animals; and orchids growing on trees.

There are times when two organisms live together closely and are absolutely dependent on each other. In these situations both organisms benefit. Such a condition is called mutualism. Mutualism can take place between two plants, two animals, or between a plant and an animal.

The lichen is an example of mutualism between two plants, an alga and a fungus. The alga is protected against drying out by the fungus, and the fungus is provided with food by the alga. Lichen can be found on bare rocks and in spots not inhabited by other plants.

An example of mutualsim between a plant and an animal can be found in the yucca plant and the yucca moth. The plant depends on the moth for transfer of pollen from one yucca flower to anoth for fertilization. The moth, on the other hand, uses the pistil of the yucca plant flower for a place to lay her eggs and for nourishment for her larvae.

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The larvae hatch and feed on the developing seeds. Mature larvae transform into pupa and emerge only when the yucca blooms again.

A third example of mutualism can be found in the bee and the flower. The bee depends on the flower for nectar as its food, and the flower needs the bee to carry its pollen to other flowers for fertilization.

A community is constantly changing. There are obvious variations night and day, winter and summer. These are known as cyclic changes, changes which occur over and over.

Some other changes in a community take place over a much longer period. One of these is ecological succession. This is the process of orderly change which occurs in communitites of plants and animals. Succession takes place in many areas. For example, what happens when succession takes place in an open meadow cleared by man to grow grain?

If the meadow is left to nature, a certain succession of events will occur. In the deciduous forest biome the root stocks of grass and flowers will grow. The wind will carry some seeds of annual wild flowers which will put out roots and grow. Grasshoppers, butterfiles, meadow mice and meadow larks will be among the members of the meadow community.

If the grass is not mowed for several years, plant succession will continue and the meadow will gradually change. The wind will carry seeds of willow, maple, and elm trees. These will put down roots and start growing, giving birds something to perch upon. The birds will carry in wild cherries and berries, and upon having eaten the fruit will discard the seeds. Some of these seeds will grow and a thicket will develop Many small animals will bring in seeds too. Soon the grasses will disappear due to lack of sun and moisture. Various types of plant and animal life that are able to adapt to these changes will survive in the new community. Those that cannot adapt will die out.

Another example of succession is a pond changing into a forest. A new pond usually has a bare bottom with few plants. Gradually organic materials settle to the bottom of the pond as a result of organisms dying and decaying. The pond becomes

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shallower as a result of erosion and accumulation of debris. New plants and animals can be found by the water. Eventually trees are growing where the edge of the pond used to be. A forest community is emerging.

The final group of plants and animals which is able to reproduce itself over and over again is called a climax community. In this type of orderly succession of plant life the various biomes are formed.

Another aspect to explore in teaching this unit is that of careers. Even at this early age children need to be given information on careers related to communities in nature. Some examples are that of a state agricultural agent, forest ranger, Conservation Department employee, science educator, and urban planner. As an employee of the Conservation Department, for instance, a person may be a soil scientists, agronomist, range conservationist, conservation forester, conservation biologist, conservation engineer, soil conservationist, etc.

A soil scientist conducts surveys which supply the basic information needed in planning and carrying out conservation practices. From the surveys it can be determined what crops can best be grown in a specific area and by what methods. It shows what conservation practices should be used for the best use of the land. A soil scientist may also be involved in the preparation of a map showing the location of the soil types within an area. This map is useful to anyone concerned with the building of dams, roads, or tunnels in that area.

Agronomy is another vocational opportunity in the conservation area. An agronomist is concerned with the relationship of plants to the soil. He may be involved with the development of only a single crop. In the Midwest, such crops as soybeans or corn may be his speciality. He may also work in the fields of plant breeding and improvement of crops. The agronomist is a specialist in cropping systems, in determining the best crops and cultivation practices to be used to preserve the maximum productive capacity of the land.

A third possible career is that of conservation biologist. His main concern is wildlife conservation, but he is also interested in the beneficial use of wildlife. The conservation

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biologist must often discourage heavy concentrations of wildlife in areas where growing crops attract birds or deer. Such a situation can be ameliorated by the setting up of bird sanctuaries and by providing feeding areas for animals. The conservation biologist is often called upon to resolve differences between groups that have opposing views on wildlife, one group wanting complete protection of wildlife and the other wanting such things as loosening of hunting laws. He works with landowners and farmers to get these forms of wildlife to inhabit their properties that will provide sport as well as add to their own food supply.

The state agricultural agent helps farmers plan which crops to raise. He takes into consideration such factors as soil types, weather conditions, and consumer demand for specific crops. He continually analyzes soil samples and checks for blight once a crop has begun growing.

A forest ranger's job entails many responsibilities. His most important duty is to spot and fight forest fires. He patrols the forest in the same way that a policeman patrols the streets. He protects the animals and restocks forest streams. He cleans up litter left by careless visitors to the forest. He also gives out information on many subjects to visitors.

Urban planning is another field that an individual might pursue if he is interested in working with communities. An urban planner estimates a city's present and future needs. He works with the citizenry to find out what their priorities are. Should the available funds be spent on an airport or a library, storm sewers or street lighting? The urban planner also works on long-range plans for "Cities of the Future."

Another possible career is that of science educator. Such a person can teach at any level in the educational structure: elementary, secondary, or college or university. The science educator trains people to become workers in the field.

Man is the most powerful being in any ecosystem because of his ability to change its operation. His ability seems to grow faster than his understanding of the results of the changes he makes. Man has a practical as well as a moral responsibility to keep the ecosystem in good order. Scientists know that the careless and indiscriminate use of water, air,

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and soil is dangerous; but man continues to upset the balance of his ecosystems. Man must learn to keep ecosystems in balance and allow nature constantly to renew our means of life. Man has a responsibility to his own community.

We have given you some information regarding communities of plants, animals, ponds, longs, milkweed plants and, of course, into man's community. It will help you explain your natural home. You will enjoy finding understanding and respect for the give and take that must exist among all living things.

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A TREE COMMUNITY

Trees are our biggest plants. They are centers of attraction for many kinds of life. A tree offers shelter and food to a great variety of creatures. Small animals make their homes among the roots and in hollows of the truck. Insects hide in cracks in the bark. Birds come to find the insects and other birds build nests among the branches.

When a tree opens its leaf buds for the year, some leaves are destined as food for caterpillars and minute fungus plants. The blossoms, fruit (generally the fleshy part of a seed), and seeds of the tree provide food for countless other creatures. Even when the tree begins its winter rest and drops its leaves, the fallen leaves are not wasted. The weather elements decay the leaves. Earthworms and bacteria in the soil complete the decomposition process, there by producing additional top soil. Robins, in turn, come to get the earthworms. And so each tree draws together a little community of creatures.

As you can see, all kinds of interaction takes place within the tree community. One of the necessities for survival in any community is the availability of food. The tree provides us with the first link in the food chain and food web, the green plant. Every food chain starts with a producer, which is an organism that produces its own food. Next in line come one, two, or three plant eaters. Then there are several meat eaters, followed by decomposers. This chain of nourishment ties the natural community together.

Trees make their own food, but they must have sunlight to do so. Trees have to compete with one another for sunlight in forests and jungles. Two things may happen in a forest during competition for sunlight. Some of the trees may grow so fast that they shut off the sunlight from the other trees, which then die. Or, the trees may grow equally fast and spindling. If a tree has used most of its food to grow tall in order to get sunlight, it cannot expand around very rapidly. The competition for sunlight helps explain why a tree grown up in the middle of a lawn away from other trees is likely to be much more beautiful than a tree of the same kind that has grown up in a forest.

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Another relationship between organisms is that of commensalism. In this interaction between two organisms, one is benefited and the other is unaffected. For instance, moss is often found on the north side of a tree. The moss obtains water from the surface cracks of the tree bark. Without this water source the moss will die. The moisture utilized by the moss does not affect the tree since the water used by a tree comes from the soil through the tree roots. Therefore, the moss benefits from the tree, but the tree is unaffected by the moss.

In the relationship known as mutualism, both organisms benefit directly from their relationship with each other, and they cannot survive without each other. An example can be found in the interaction between a termite and a protozoan which lives in the intestine of the termite. The termite can chew and swallow wood, but without the protozoan aiding it in the digestive process (it digests the chips of wood that the termite swallows) the termite would gain no nourishment. In return, the protozoan has a safe place to live and a steady food supply.

Every community is influenced by abiotic factors, which are the non-living factors. There are five of these factors that are usually considered prime. The first one is light which is mandatory for plants to carry on photosynthesis. Without this process no food chain could exist, because the green plant is the producer and starter of it. Sunlight is needed for the growth of green plants and as a result by the consumers in the food chain which depend on them for energy.

A second factor of great importance is temperature. Temperature limits the type of vegetation and living organisms that can be found in a specific area. Trees that exist in the St. Louis area would not generally adapt to desert or arctic temperatures.

A third important factor is that of atmospheric gases. Carbon dioxide is necessary in the process of photosynthesis and thus an essential part of the food chain. Oxygen is needed by all the animals and plants that are a part of the tree community.

Fourth, humidity and water are very necessary for many plants and animals to function properly.

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Our fifth and final abiotic factor, the substratum, or base material in which an organism lives, determines the type of vegetation and organisms that exist in a particular area.

The seasons of the year affect the tree community. In the spring the trees come alive from the long, dormant winter. Buds open into leaves, animals and birds return to find their homes.

In order for trees to reproduce, seeds are dispersed by the wind, animals, insects, or buds. Thus the animal community is interacting with the tree community. In the summer the trees and young saplings flourish.

In the fall, animals gather food supplies from the trees as the tree itself prepares for winter. The changing leaves are an indication of the life cycle that occurs in the different seasons. Many animals and birds abandon their tree homes and either migrate or hibernate till spring returns. In the winter the tree does not die, but remains alive even though it is barren of leaves.

The trees that grow in a specific area are trees that have adapted to their environment. Thus we have a climax situation or the end result of succession.

The tree community plays a very important role in the balance of nature and affects all types of life. Animals, plants, and man depend on trees and their many and varied uses. Trees have played an important part in the history of man. We often take the tree community for granted and overlook the value, usefulness, and enjoyment we get from trees.

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VOCABULARY

1. Community - A group of plants and animals interacting with each other.

2. Biome - A large ecological unit which is able to maintain itself. It is the result of interaction of plants and animals with the climate and substrata of the region.

3. Ecology - The relationship of living things to each other and their physical environment.

4. Ecotone - The borderline where two different communities meet and blend; for example, forest and grassland, sea and shore.

5. Substratum - The base or material on which an organism lives.

6. Succession - The orderly change of communities through a series of stages to a climax.

7. Climax - The end result of succession.

8. Mutualism - A relationship where both organisms benefit; for example, termites eat wood, bacteria decompose it.

9. Commensalism - An interaction between two organisms where one benefits and the other is unaffected; for example, orchids grow on trees.

10. Ecosystem - An area in which you will find living organisms and non-living things working together, exchanging the materials of life and using them over and over again.

11. Biotic Community - Any collection of plants and animals living in a given area which is held together by the organismal relationship with and dependance upon each other.

12. Biotic Factors - All living things in the environment.

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13. Abiotic Factors - All the non-living things in the environment, such as: evaporation, temperature, etc.

14. Food Chain - A transfer of food energy from a producer to a consumer to a reducer.

15. Food Web - Food chains that are interwoven and interlocked with other chains. Example: Plants=producers--nectar for butterfly--dragonfly feeds on butterfly--toad feeds on dragonfly--snake preys upon toad--hawk kills the snake--hunter slays the hawk--remains of hawk are acted upon by bacteria and molds. (reducers)

16. Reducers - The bacteria and molds that change plant and animal remains into soil nutrients which green plants need to grow.

17. Producers - The green plants that begin the food chains and food webs.

18. Primary Consumers - First eaters which feed on the sugar and other food substances stored in green plants.

19. Secondary Consumers - Feed on herbivores or first consumers.

20. Photosynthesis - The process by which green plants exposed to the light of the sun combine carbon dioxide and water to produce basic food substance.

21. Competition - The rivalry resulting from wanting or needing the same thing; for example, plants compete for water, animals for food.

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INSTRUCTIONAL SEQUENCE

UNIT PLAN -- SEQUENTIAL ORDER

Room Preparation

1. Check with the librarian for available reference material to be used in the room and in the library.

2. Order the films and filmstrips that are appropriate to the unit.

3. Gather your visual aids and resources.

4. Have a collection of materials, such as identification books, mounting boards, butterfly nets, and insect jars for the children who choose to study the insect community.

5. Plan and make arrangements for field trips well in advance.

6. Make arrangements with resource people to come in to speak if possible.

7. The teacher can prepare a bulletin board or have the materials gathered to be put up after the pre-post test has been given. Make sure you put up a human community as well as a plant or animal community.

8. Have magazines available so that pictures of communities can be found and cut out.

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Pre-post test - Administer and evaluate.

Daily Schedule

I. Introduce the concept of any community.

A. Give a general description of the behavioral objectives.

B. Use the overhead or visuals to introduce the concept of a community.

C. Divide the class into small groups. Give each group four pictures, with only one showing a community. Have each group discuss why they chose the picture of the community and be ready to tell the rest of the class.

D. Show the film Living Things Everywhere, to reinforce the learning of the day.

II. Show the film Communities Depend on Each Other.

A. Take a walk outdoors to find a community. Go up to a tree; look at the soil, look for the living things in the soil; look at the bark; look at the living things in the bark; look at the height of the tree; look at the size of the leaves. Discuss how the tree is beneficial to plants, animals and humans.

B. Specifically look at a tree community. Have the children watch for any living things. Discuss how they are interacting with the tree. Example: a bird's nest. The nest is benefiting and the tree is unaffected (commensalism).

III. Discuss the five non-living environmental factors. Have the children do an art project such as a drawing, diorama, or mural to show their concept of a community.

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IV. Discuss the different seasons of the year. You may show a film on a particular season which you are studying. Talk about your tree community, the changes it makes in the various seasons, and how these changes affect the habitants of the tree. Perhaps the children can write a play about how the seasons affect the communities.

A. Take another walk. The object of this walk is to find examples and proof of how particular seasons affect plant and animal life.
Examples: squirrels gathering nuts
abandoned nests
appearance of butterflies
cocoons
dying flowers
changing leaf colors
Before you go out prepare a check-list of what the children may expect to find. After coming back discuss how many things were found. Also, see if any additional items were located that were not listed.

V. Display artificial flowers or fruit to help the children develop a concept of what "artificial" means. Present the idea that man lives in an artificial community. A suggested activity would be to mark off two areas of land on the school grounds and plant both areas with seeds of your choice.

A. The children will take care of one section and the other will be left to nature. Have the children notice the difference between man's controlled environment versus nature's. The concept to be proved is that man is externally controlling his man-made community. Possible field trips are to the zoo, Grant's Farm, Suson Park, a tree farm, or a dairy farm (Adams). This would be an excellent opportunity to use math concepts in measuring off the land, counting the seeds, etc. To measure, you might incorporate the use of the metric system by using a metric stick.

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VI. Go outdoors and find an example of an insect feeding on a plant, such as a grasshopper eating a leaf or a rabbit eating grass.

VII. When talking about the concept of the food chain and food web, introduce the children to the terms of producer and consumer. Take the children outside, show them a green plant, and stress the idea that the green plant is always the producer, since it makes its own food. Have the children study various plants looking for insects feeding on them. Point out the fact that the insect is a consumer. Further discuss other animals that are consumers, such as butterflies, bees, squirrels, and birds. Be sure the concept of the food chain and food web has been covered. See the diagram. A suggested activity is to have the children hold hands and role-play the links of the food chain, expanding it to the food web.

VIII. Show the film Human and Animal Beginnings. Discuss the film. One question may arise: What would happen if the animals shown did not have babies? Take the children outside and play a game such as Red Rover or Bombardment in order to show the meaning of competition. When you return to your classroom discuss what the children just did. They competed. Point out that they competed in order to win rather than because they did not like each other. Relate this to predator-prey relationships. Experiment: Build terrariums, either individually (small glass jars) or as a class. Fill the jars or a glass tank with rich soil, grass, plants, flowers, rocks, and various insects. Cover with clear plastic. This can demonstrate the predator-prey relationship and reproduction in an environment. Refer to the Zaner-Bloser third grade science book.

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IX. Discuss the fact that there are two other ways in which plants or animals live together. In mutualism each member benefits from this way of life. One member cannot live without the other under natural conditions. On a rock you often find lichen, which is alga and fungus living together The thread of fungus supplies water to the green cells of the alga plant which make food for both of them. The mutualism benefits each member. Refer to the background information on the tree community. Take the children outside to look for another example of mutualism in the honeybee-flower relationship. The flowers require the services of bees to bring them pollen for fertilization, and bees gather both pollen and nectar from the flowers in order to manufacture honey upon which they nourish the inhabitants of the hive. Show the film The Honeybee.

Another way in which plants or animals live together is called commensalism. One member receives benefits and the other member is not hurt by the relationship. For example, a bluebird may live in a woodpecker hole. Refer to the background information of the tree community. Once again, take the children outside to look for examples.

X. Introduce the concept of succession. Show pictures of the different stages of succession. Briefly talk about the different plant and animal life found. To reinforce the concept, show the film Succession: Dune to Forest. Since it is a junior-senior high level film, you may want to turn off the sound and narrate yourself, or stop the film and discuss certain aspects. After viewing the film, depending on the interest level of your class, you may want to do a worksheet together (see example). You may wish to have the students draw their idea of succession, or pass out cards with various plant and animal names and have the children place them on a teacher-made drawing of the different stages of succession. It is very important to stress that the last stage of succession is a climax community. If there is an area outside your school which shows an example of succession, you may want to take the children outside and look at the "edge"; eg., grass

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leading to the small underbrush to the understory trees and finally the climax stage. You may have them draw this or just point it out.

Field trip to: Missouri Botanical Gardens
Arboretum and Nature Reserve
Box 93
Gray Summit, Missouri 63039

(314) 742-4411
(314) 865-0440 Station 33

1. Wilderness Wagon - An hour-long guided tour through the reserve. The wagon accommodates 28 passengers.
2. Guided tours.

IX. Invite a speaker from the Missouri Conservation Department to come to the school to speak to the class on the various jobs held by Conservation Department employees.

Direct inquiries to:
Missouri Conservation Department
1221 South Brentwood Blvd., St. Louis, Mo.
Pa. 6-6800.

Write to the State Forester for information or to arrange for a speaker to come to the classroom to describe job opportunities with the Forestry Service. Inquire at:

State Forester
U.S. Forestry Service
Jefferson City, Missouri

Have a "Career Day." - Gather booklets, pamphlets, etc. on job opportunities from the sources listed below and make them available to the students. Let the children spend half of the period going through this material, and then discuss some of the information they found.

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National Wildlife Federation, 1412 Sixteenth Street, N.W.
Washington, D.C. 20036

Wildlife Management Institute, 709 Wire Building,
Washington, D.C. 20005

The American Forestry Association, 919 Seventeenth St., N.W.
Washington, D.C. 20006

National Parks Assocation, 1701 Eighteenth Street, N.W.,
Washington, D.C. 20009

U.S. Department of Agriculture, Forest Service,
Washington, D.C. 20250

U.S. Department of Agriculture, Soil Conservation Service
Washington, D.C. 20250

Association of State Foresters, Office of the President
Lansing, Michigan

Association of Midwest Fish and Game Commissioners
Dept. of Fish and Game
Dept. of Conservation
State Office Building
St. Paul, Minnesota

Department of Housing and Urban Development, Washington, D.C.

Department of the Interior, 633 Indiana Avenue, N.W.,
Washington, D.C. 20240

XII. Review the concepts which you have presented in this unit and give the pre-post test again.

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PRE-POST TEST

I. Write T if the answer is true and F if the answer is false.

Behavioral objective and test question number--

1. 1. A community is a group of plants and animals living together.

4. 2. Life in communities does not change with the seasons.

5. 3. All communities must contain plant life.

6. 4. An artificial community is one which must be controlled by man.

9. 5. Plants and animals must reproduce in order for the species to go on.

7. 6. Plant and animal communities do not affect each other.

II. Fill in the blanks with correct answer

3. 7. List the five non-living things that are found in all communities.

a. _____
b. _____
c. _____
d. _____
e. _____

8. 8. One example of a food chain is a cow, grass and man. Put them in the correct order as they would appear in the food chain, and label them producer and consumer.

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15. 9. List three possible careers related to communities in nature, and three activities a person who held each job would perform.

A. _____
1. _____
2. _____
3. _____

B. _____
1. _____
2. _____
3. _____

C. _____
1. _____
2. _____
3. _____

III. Complete these sentences by putting the correct letter from the second column on the blank line.

13. 10. Succession is _____

14. 11. A climax community is _____

10. 12. Competition is _____

11. 13. Mutualism is _____

12. 14. Commensalism is _____

a. The last community to develop in a given area.
b. when one community replaces another community.
c. when two organisms interact with one benefiting and the other not hurt, such as the bluebird living in a woodpecker hole.
d. when organisms struggle with each other for food or for life.
e. when two organisms live together and both benefit.

IV. On the back of this paper, draw an example of a community.

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PRE-POST TEST
ANSWER SHEET

There are 15 points possible. Each question is worth 1 point.

I. True and False

1. T
2. F
3. T
4. T
5. T
6. F

II. Fill in the blanks

7. air, water, temperature; light, soil

(3 out of 5 must be correct to score one point)

8. grass — producer; cow — consumer; man — consumer

(All answers must be correct and in proper order to score one point.

9. forest ranger, conservationist, urban planner; state agricultural agent, science teacher

Any of the above are acceptable. All 3 answers must be correct to score one point.

III. Completion

10. b
11. a
12. d
13. e
14. c

IV. Drawings will vary and must be individually evaluated.

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School _____

Teacher _____

Unit _____

Student post-test results will be grouped in the following manner:

Example:

Number of post-test questions given 15 .

Number of students	Number of questions answered correctly.
6	12
5	10
8	9

Number of post-test questions given. ____

Number of Students	Number of Questions Answered Correctly

Number of post-test questions given. ____

Number of Students	Number of Questions Answered Correctly

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Additional Activities

The following are additional suggested activities for you to use at your discretion in the Community Unit. Correlate them when you think they will best benefit your class and the unit design.

1. Use creative movement (trees, animals, etc.).

2. Find poems relation to trees (e.g., "Trees" by Joyce Kilmer).

3. Create poems about trees, seasons, or concepts covered in the unit.

4. Listen for sounds in the environment and possibly tape record them.

5. Do a crossword puzzle. (See example in the unit).

6. Find and sing songs related to the unit.

7. Make a cast of a leaf in this way: Find a cardboard box large enough so that the chosen leaf can lie flat in it. Press the leaf down into the clay. Remove the leaf. Then mix a cupful of plaster of Paris with enough water to make a thick paste. Pour this paste into the box. Let it stand until hard. Then take out the block. The block should have a cast of the leaf on the underside. You may paint the cast of the leaf after the plaster is dry.

8. Take a walk on a particular street in the neighborhood. Identify and count all the various types of trees found, and possibly make a map of the locations of the trees.

9. Make mobiles depicting a specific community and hang them up (plants, animals, food web, etc.).

10. Create puppets for use in plays or to depict various animal members of a community.

11. Make a stitchery project using burlap as the background. Create a mural about communities. Use yarn, appliques, etc. and display the completed mural as a wall hanging. Use chalk to outline the mural.

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12. Make natural collages by gluing natural items on heavy cardboard. Coat with a polymer medium to preserve them.

13. Make prints by using cardboard and thin objects of nature. Glue down the objects and shellac them. Then use a brayer or brush to paint over the surface and print it on paper, fabric, etc.

14. Do paper sculpture using construction paper, glue, etc. to create three-dimensional animals.

15. In doing a clay project, decorate it with leaf imprints, acorns, etc.

16. Make a notebook which includes reports, drawings, and any hand-out pages, and decorate it with marbilized paper, monoprints, etc.

17. Play the "Community Billboards Game." See the unit "Learning About Topography by Utilizing the Parkway District."

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These books are from the Pierremont and Clarkson libraries. Check your own card catalogue for these books.

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Materials

Ecological Factors (A Poster Series)
by Harold R. Hungerford & Audrey N. Tomera
Portland, Maine, J. Weston Walch, Publisher, 1972.

(This material consists of a set of 18 posters and is available upon request at the E.E.E. Office.)

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Films

Below is a list of films which can be obtained from St. Louis County Audio Visual.

1. Animals in Autumn (10 minutes, P.I.)
2. Animals in Spring (10 minutes, P.I,)
3. Animals in Summer (11 minutes, P.I.)
4. Animals in Winter (10 minutes, P.I.)
5. Communities Depend on Each Other (11 minutes, P.I.J.)
6. Dunes (7 minutes, P.I.J.S.A.)
7. Honeybee (10 minutes, I.J.S.)
8. Human and Animal Beginnings (11 minutes, P.I.J.)
9. Living Things Depend on Each Other (11 minutes, P.I.J.)
10. Living Things Everywhere (11 minutes, P.I.)
11. Succession: Dune to Forest (16 Minutes, J.S.)
12. The Tree (10 minutes, P.I.J.)
13. Wonders in a Country Stream (10 minutes, P.)
14. Wonders in Your Own Backyard (10 minutes, P.)

The following films are available from the Missouri Conservation Department, 1221 South Brentwood Boulevard, PA 6-6800, upon request and without charge. When requesting films, call at least two weeks in advance of your scheduled show date.

1. A Place to Live (20 minutes)
2. Bobwhite Through the Year (48 minutes)
3. Common Animals of the Woods (12 minutes)
4. Cottontail (53 minutes)
5. Family Life of Birds (20 minutes)

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6. Snapping Turtle, The (12 minutes)

7. Red-Winged Blackbird Story (silent film - 12 minutes)

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DATA SHEETS

FOOD WEB

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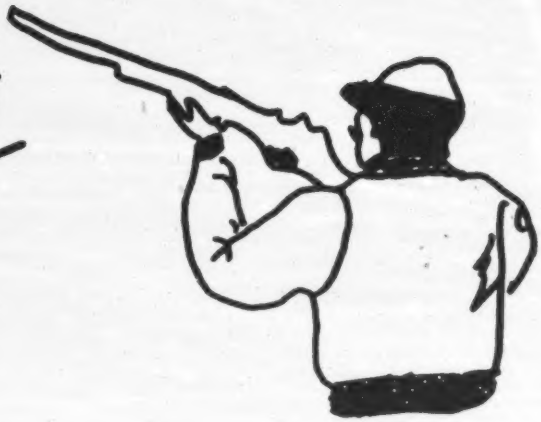
GREEN PLANTS
(PRODUCERS)

BACTERIA AND MOLDS
(REDUCERS)
Change snake remains into soil nutrients.

CONSUMERS



STAGES OF SUCCESSION

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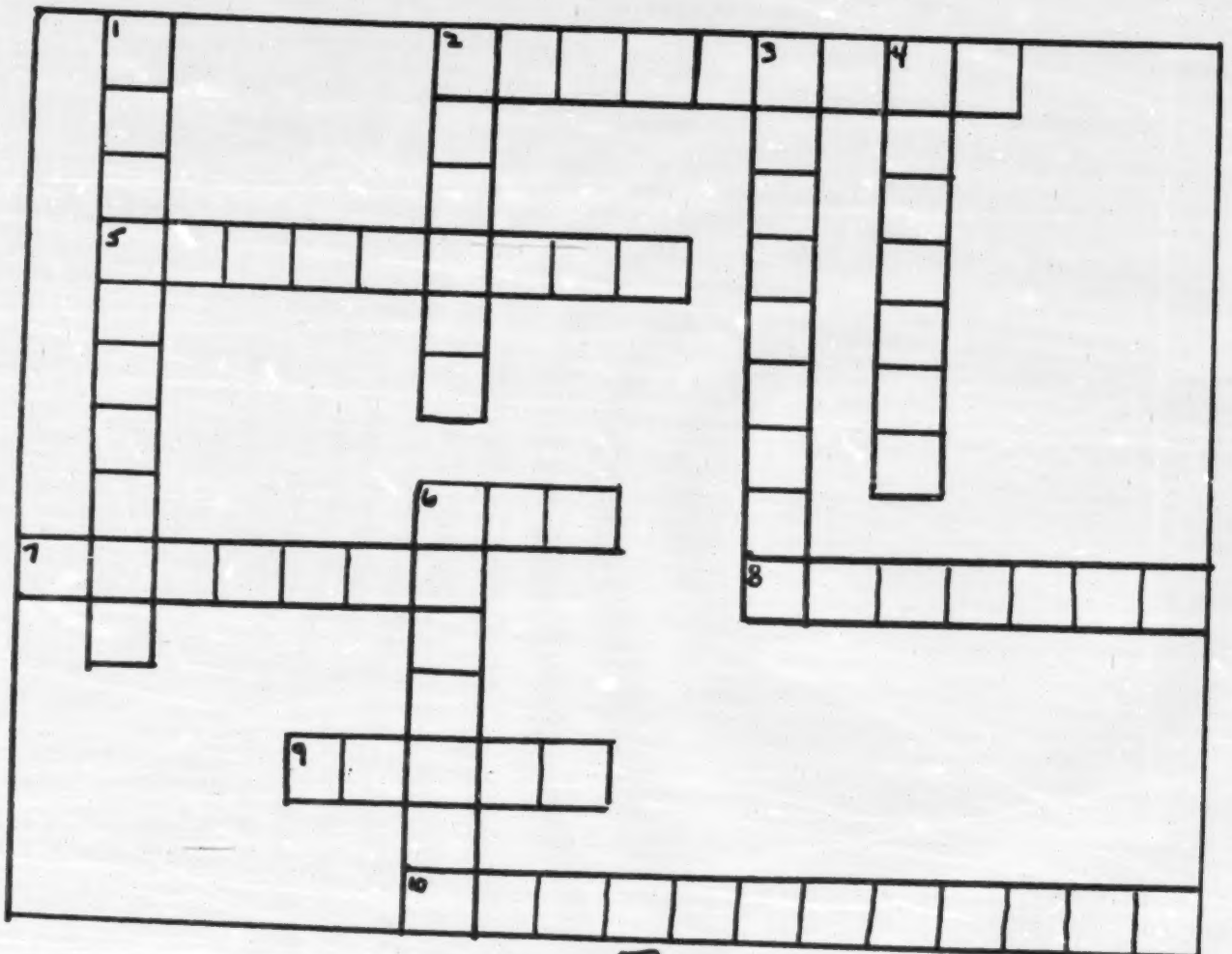

COMMUNITY WORD PUZZLE

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CROSSWORD PUZZLE

DOWN

1. When an area does through several different stages and ends in a final climax stage, this is called _____.
2. _____ are in almost all communities.
3. Animals that eat plants are called _____.
4. The final stage of the food web is the _____.
6. Non-living factors in an environment are called _____.

ACROSS

2. The green plant is called the _____.
5. A group of things working with each other is called a _____.
6. Plants, animals, and man need this to breathe _____.
7. Name given to additional members that are added to the food chain (two words) _____.
8. _____affect the community life cycle. There are four of these every year--an example being fall.
9. All plants and animals need _____ to exist.
10. When two plants or two animals fight for food to live this is called _____.

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KEY TO CROSSWORD PUZZLE

DOWN

1. Succession
2. Plants
3. Consumers
4. Reducer
6. Abiotic

ACROSS

2. Producer
5. Community
6. Air
7. Food Web
8. Seasons
9. Water
10. Competition